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By DW NARA Date 9Dec22

File-Test Section Infantry Board.

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REPORT

of

The Infantry Board

No. 1693

2.36" ROCKET, (INCENDIARY) T-31

FORT BENNING, GEORGIA

14 OCT 1944

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1579 BENNING 8-10-43 2,000

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IB-471.94

14 OCT 1944

SUBJECT: Rockets, 2.36" (Incendiary) T-31.

TO: The Chief, Ground Requirements Section, Headquarters Army Ground Forces, Army War College, Washington, D. C.

1. Authority. a. Test of the subject Rocket, 2.36", T-31 (Incendiary), was directed by letter, Ground Requirements Section, Headquarters Army Ground Forces, dated 20 July 1944, 471.94 (C) (20 Jul 1944) GNRQT-11/91720. (Appendix B)

b. Included in the same directive were Rockets, 2.36" M6A3 and M7A3 loaded with a new type of propellant (EJ). These rockets were tested concurrently with the subject incendiary rocket, but report of tests of the former has been deferred due to advice that a further shipment of the M6A3 and M7A3 rockets, loaded with another variant of the new propellant, (designated EJB) was due, and it was considered advisable to segregate the results of tests on both types of propellants in a subsequent report after completion of all tests. The present report is therefore confined to the Incendiary Rocket, T-31.

2. Description of Material. Incendiary Rocket, 2.36", T-31 differs from the standard 2.36" rockets (T26E2 and M6A3) only in that it has a thermite filled head with the necessary starting mixture and ignition type of fuze. It is designed purely as an incendiary ammunition. (Figures 1 and 2)

3. The Purpose of the Test was, generally, to determine the value of this type of rocket as a munition for Infantry use. Specifically, data were sought on the following points:

a. Casualty producing effect.

b. Incendiary or other effect against concrete and reinforced pill-boxes and emplacements.

c. Effect against armor.

d. Effect against structures constructed wholly or partly of combustible materials.

4. Factual Background for the development of this incendiary rocket is not known to The Infantry Board. Previous tests by the Board of small

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thermite loaded items of the hand-grenade type had indicated limited use for such munitions in the destruction of ordnance materials and motor vehicles, but had established that, owing to their relatively slow action they were ineffective unless accurately placed and held in position for some time. However, the nearest approach to an incendiary projectile, other than incendiary bullets for small arms, available to the Infantry at present is the various types of rockets, grenades and shells loaded with white phosphorus, whose incendiary value is quite limited.

5. Facts Disclosed by the Tests, details of which are given in the appended Record of Test, are:

a. The physical characteristics of the subject Incendiary Rocket, 2.36", T-31, are almost identical with other standard 2.36" rocket, except that it is shorter. (Test No. 1)

b. The subject incendiary rocket is wholly ineffective against armor or armored vehicles. (Test No. 2)

c. The subject rocket, due to the small volume of incendiary material and the difficulty of holding it in place long enough to produce incendiary results, is only partially effective against wooden structures. (Test No. 3)

d. The subject incendiary rocket is approximately equal to the corresponding white phosphorus rocket, 2.36, T26E2, as a means of setting fire to vegetation. (Test No. 4)

e. The subject incendiary rocket is wholly ineffective as an antipersonnel munition. (Test No. 5)

f. The subject incendiary rocket is ineffective against pill-boxes and bunkers of any construction. (Test No. 6)

g. The subject incendiary rocket has limited effectiveness as an illuminating shell for placing an illuminant of short duration on the surface of the ground at a distance within range of the rocket. (Test No. 7)

6. Discussion. The Infantry Board has not, on the basis of the facts disclosed as stated above, been able to visualize any tactical use for this incendiary rocket of sufficient importance or general application to warrant its adoption. As an incendiary projectile it is surprisingly ineffective. Its only possible use would be to set fire to wooden structures

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of such nature that the incendiary head could be buried in the combustible material or held in position against it long enough to start a fire. Even for this purpose it would be effective only against unoccupied structures, since the limited size of the initial conflagration produced renders it easy to extinguish. For this use it seems likely that white phosphorus rockets or grenade would, on the whole, prove equally effective, and these have, in addition to any incendiary effects they may have, important anti-personnel and screening effects. For use against fuel tanks the subject rocket might be effective, but would, even in such cases, only be duplicating the effect of other incendiary material already standard. Many of the present standard pyrotechnic and illuminating munitions appear, in practice, to be practically equal to the subject rocket as incendiaries, and it is difficult therefore to justify an item which is a relatively poor incendiary and has no other uses.

7. Conclusions. The Infantry Board concludes:

That the subject Rocket, 2.36", Incendiary, T-31, is ineffective and unsatisfactory for Infantry use.

8. Recommendation. The Infantry Board recommends:

That the subject Rocket, 2.36", Incendiary, T-31, be given no further consideration for Infantry use.

For the President:

INGOMAR M. OSETH,
Colonel, Infantry,
Director.

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RECORD of TEST

ON

2.36" ROCKET, (INCENDIARY) T-31

TEST SECTION
THE INFANTRY BOARD

FORT BENNING, GEORGIA

**TO: THE DIRECTOR, THE INFANTRY BOARD.
HEREWITH DETAILED RECORD OF TESTS
RELATING TO THE ABOVE PROJECT.**

WILLIAM P. O'NEAL, Jr.,
Major, Infantry,
CHIEF, TEST SECTION

8 Copies.

Copy No. 6

Date 26 September 1944

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By DW NARA Date 9 Dec 22

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TEST SECTION
THE INFANTRY BOARD
FORT BENNING, GEORGIA

26 SEPTEMBER 1944

SUBJECT: RECORD OF TEST OF 2.36" ROCKET, (INCENDIARY) T-31

TO: THE PRESIDENT, THE INFANTRY BOARD, FORT BENNING, GEORGIA

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I-N-D-E-X

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1. Authority and References.

a. Authority: Memorandum, The Infantry Board, (IB-471.94) 24 July 1944. (Appendix "A")

b. Reference: Letter, Headquarters Army Ground Forces, (471.94 (C) GNRQT-11/91720) 20 July 1944. (Appendix "B")

2. Introductory Information.

a. The subject rocket is the 2.36" Rocket, Incendiary, T-31. This rocket has a thermit filled head designed to produce intense heat in a localized fire. The thermit filling is one which is in use in standard grenades. The rocket assembly is merely a means of projecting this incendiary.

b. The motor-tube and tail assembly of this rocket are those of the 2.36" Rocket, AT, M6A3 or the 2.36" Rocket, W.P., T26E2. The head and fuze assembly have been changed. Since thermit must be ignited, a starting mixture is provided in the fuze assembly to replace the booster in the M6A3. Figure 1 shows the T-31, T26E2, and the M6A3 rockets complete. Figure 2 shows the T-31, T26E2, and M6A3 heads. Throughout this report the 2.36" Rocket, Incendiary, T31, for purpose of convenience, shall be known as T-31.

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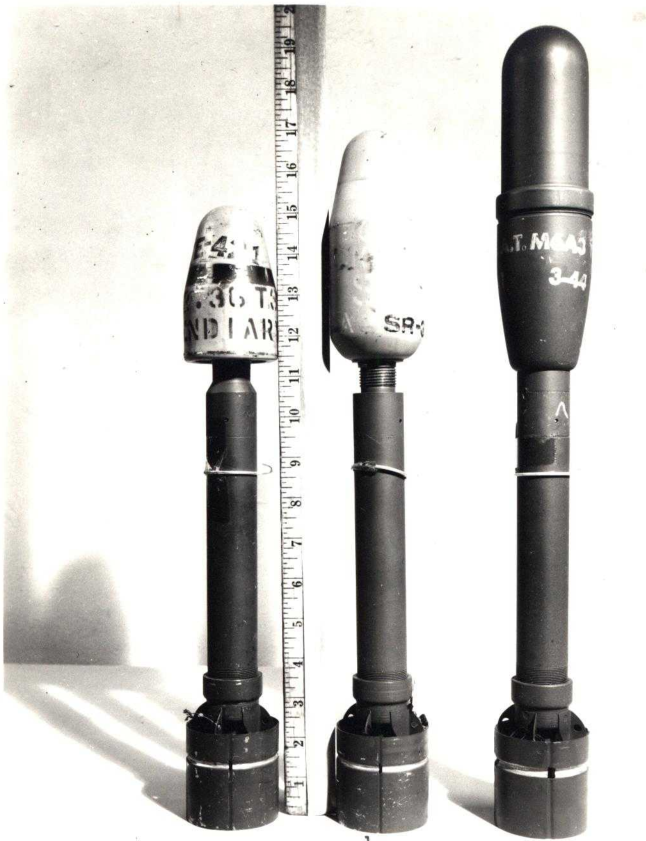

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T-31, T26E2 and M6A3 rockets to show similarity of motor-tubes and tail assemblies.

a - T-31 rocket.
b - T26E2 rocket.
c - M6A3 rocket.

Figure 1

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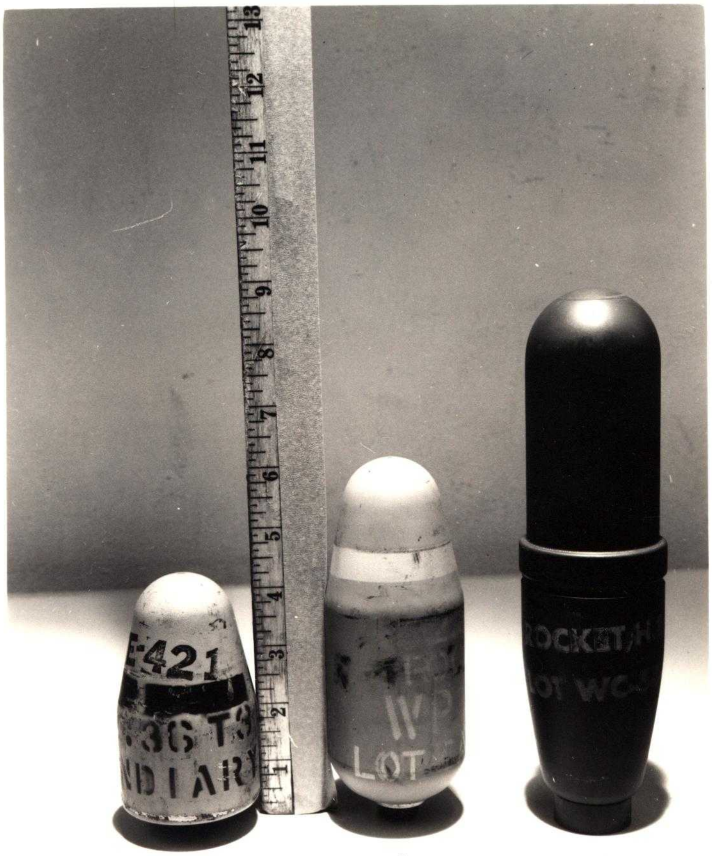

a b c 45161-4

T-31, T26E2 and M6A3 heads to show differences in length.

a - Head of T-31 rocket.
b - Head of T26E2 rocket.
c - Head of M6A3 rocket.

Figure 2

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3. Purpose of Test.

To determine:

a. The physical characteristics of the T-31 as compared to other 2.36" rockets.

b. The effect of the T-31 rocket when used against armor.

c. The effect of the T-31 when fired against a wooden building.

d. The comparative efficiency of the T-31 and the W.P. rockets for starting brush or grass fires.

e. The value of the T-31 as an antipersonnel agent.

f. The value of the T-31 as an incendiary agent against dirt constructions reinforced by timbers.

g. The value of the T-31 when used as an illuminant.

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4. Details of Tests and Results.

Test No. 1

a. Purpose: To determine the physical characteristics of the T-31 as compared to other 2.36" rockets.

b. Method: By weighing and measuring.

c. Results:

	T-31	M6A3	T26E2
Weight	3.42 lbs.	3.45 lbs.	3.47 lbs.
Weight of head	1.62 lbs.	1.65 lbs.	1.65 lbs.
Length	15.40"	19.20"	17.00"
Length of head	4.30"	8.70"	6.12"

The motor tube assemblies without fuze assemblies are identical except for the fuze fittings or adapters. The fuze assemblies are similar in design, each being modified for a specific purpose.

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Test No. 2

a. Purpose: To determine the effect of the T-31 rocket when used against armor.

b. Method: T-31 rockets were fired at a salvaged light tank.

c. Results:

(1) Because of the time lag between the moment of impact and the period of intense burning, the rocket does not function effectively against armor. The rocket upon striking the tank will ricochet, sometime fifty to seventy-five yards before effective burning starts.

(2) Of ten rockets fired against the tank only one did any damage, this one rocket struck the tank hull and lodged between the hull and a bogie assembly. The total damage was one rubber block burned. This would not have immobilized the tank.

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Test No. 3

a. Purpose: To determine the effect of the T-31 when fired against a wooden building.

b. Method: T-31's were fired at a building made of wood, partitioned and walled with beaver board.

c. Results:

(1) The first rocket fired penetrated the siding and the inner wall of the house and burned on the floor. This rocket burned through the floor down onto the ground without setting the house afire.

(2) Rocket #2 hit a heavy, solid part of the wall and ricocheted away from the building to burn harmlessly on the ground.

(3) Rocket #3 went through a window, penetrated the opposite wall and burned outside the house on the far side.

(4) Rocket #4 penetrated the roof of the house and burned through the ceiling, it then dropped to the floor and burned through it. The fire was easily controlled and extinguished.

(5) Rocket #5 penetrated the siding and wall and imbedded itself in the opposite partition where it burned. This rocket started a fire which rapidly became uncontrollable and destroyed the building.

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Test No. 4

a. Purpose: To determine the comparative efficiency of the T-31 and the W.P. rockets for starting brush or grass fires.

b. Method: T-31's and T26E2 rockets were fired alternately at brushy and grassy areas.

c. Results:

(1) Neither rocket is efficient for starting fires in green, damp areas. Both may start small fires but these fires die out.

(2) Both will start fires in dry grass or brush. The W.P. fires are wider spread and therefore more effective. The W.P. bursts upon impact and flying particles of fire are thrown in every direction.

(3) The T-31 burns in one small intensely hot pool which may or may not be on or next to inflammable material. This is particularly true because of the delay between impact and burning, which makes predetermined areas difficult to hit.

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Test No. 5

a. Purpose: To determine the value of the T-31 as an antipersonnel agent.

b. Method: By study of the rocket and its functioning throughout the period of the test.

c. Results:

(1) The T-31 cannot be considered an antipersonnel agent. Short of a direct hit the T-31 would have no effect on personnel who were free to move away from it.

(2) The T-31 contains no burster to spread the flaming thermit and despite the intense localized heat a man can stand close to the burning thermit without discomfort.

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Test No. 6

a. Purpose: To determine the value of the T-31 as an incendiary agent against dirt constructions reinforced by timbers.

b. Method: The T-31's were used against pill boxes constructed of logs and dirt.

c. Results:

(1) The T-31 rocket is ineffectual against constructions of this type. If the rocket strikes and remains in the dirt, it is either smothered by dirt sifting down over the fire or the fire is confined in a small, baked area.

(2) If the T-31 rocket strikes a wooden support it will generally bounce away to burn ineffectively on the ground.

(3) If by chance the T-31 comes to rest and burns on or next to a wooden support, a small fire may be started. This fire can be extinguished by dirt placed on it.

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Test No. 7

a. Purpose: To determine the value of the T-31 when used as an illuminant.

b. Method: T-31's were fired at target areas at various ranges.

c. Results:

(1) At short distances the T-31 is a good illuminant although short lived.

(2) When fired for short ranges at flat angles the T-31 richochetes as much as 100 yards before effective burning is reached; thus placing the illuminant on a predetermined target is largely a matter of chance.

(3) The flash of the rocket as fired discloses the gunner's position long before the T-31 can possible disclose the position of the enemy.

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5. Summary of Facts Determined by Tests.

a. The T-31 although only 15.4" long as against 19.2" for the M6A3, weighs 3.42 lbs while the M6A3 weighs 3.45 lbs. Motor tubes and tail assemblies are very similar. (Test No. 1)

b. Because of the time lag between impact and burning, the T-31 is of little value against armor. The fault does not lie in the incendiary powder but rather in the delay in the functioning of the incendiary. (Test No. 2)

c. The T-31 rocket when used against a wooden building has a definite incendiary value if chance lodges the rocket in an inflammable area. (Test No. 3)

d. Because of its widespread bursting area the W.P. is as good an incendiary agent as the T-31 when used in grass or brush. The T-31 must hit a combustible point while the W.P. may be fired at an area. (Test No. 4)

e. Short of a direct hit the antipersonnel effect of the T-31 is negligible. (Test No. 5)

f. The T-31 is of little value against dirt constructions which are reinforced by timbers. (Test No. 6)

g. The T-31 is a good illuminant although short-lived. The placing of the T-31 on the exact area to be illuminated is largely a matter of chance at short ranges where the illumination would be effective. At short ranges the flash of the rocket at the launcher discloses and illuminates the gunner. (Test No. 7)

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6. Test Officer's Discussion.

a. In all of the firing of the T-31 rocket no employment of it could be found where it was essential. In most cases either the H.E. or the W.P. rocket could be used; or as in the case of illuminating a target, standard means would be more effective. The T-31 rocket is not efficient as an incendiary because of the difficulty entailed in placing it on the desired target; and since it was designed as an incendiary agent this difficulty would seem to render it almost valueless.

b. The T-31's fired in tests functioned as planned except for one incident, where one rocket burst upon impact. This was an isolated case and no explanation can be offered for it.

KENNETH D. SHELDON,
Captain, Infantry,
Test Officer.

I concur in the above report:

WILLIAM P. O'NEAL, JR.,
Major, Infantry,
Chief of Test Section.